

## Don't Neglect Your Boilers Just Because They Operate Automatically

Just before Christmas 2003, an earth-shaking boiler incident was reported in central Wisconsin. The preliminary investigation revealed extensive property damage, personal injuries and fortunately no fatalities. Due to this fact, the Department wishes to provide boiler owners and operators some important inspection requirements, maintenance tips and other quick and easy references to assist in the prevention of future accidents in Wisconsin.

To assist with maintenance planning, the National Board's violation tracking statistics for the 3<sup>rd</sup> Quarter 2003 (available on the National Board website shown below) indicate that the majority of violations reported were in the boiler controls, components and piping areas. Since these statistics identify problem areas and trends related to boiler and pressure vessel operation, installation, maintenance, and repair, owner/operators can and should use such statistics to plan maintenance that may eliminate these unwanted trends. Proper inspection and regular routine maintenance are necessary to assure uninterrupted, reliable and safe boiler operation.

The Department is confident the following information will assist all boiler owners and operators to understand and possibly prevent a similar incident that occurred on 12-23-03 in central Wisconsin. Our message ..... "don't neglect your boiler just because they operate automatically".

### WISCONSIN COMMERCIAL BOILER INSPECTION REQUIREMENTS

Power Boilers (steam pressure set above 15 pounds per square inch) require an **internal inspection every 12 months**. This means both the watersides and firesides must be opened and cleaned prior to visual inspection by a certified inspector. It is important that owners or operators also remove plugs and caps to water column piping and low water cutoff devices to verify pipe connections are free and clear of mud, sludge or other obstructions. After the inspection, a certified inspector may indicate satisfactory conditions on an inspection report, provide a report copy to the owner/operator and submit the original report to the Department. Upon receipt, the Department issues a "permit to operate-PTO" that shall be posted on the premises by the owner or operator.

Steam Heating Boilers (steam pressure set at or below 15 pounds per square inch) require an **external inspection every 36 months**. This means a visual inspection by a certified inspector can be completed while the boiler is in operation. Although it is a recommended maintenance item, owners are not required to remove plugs and caps to water column piping and low water cutoff devices to verify pipe connections are free and clear of mud and sludge. After the inspection, a certified inspector may indicate satisfactory conditions on the inspection report to issue a PTO. The inspector will provide a report copy to the owner/operator and submit the original report to the Department. Upon receipt, the Department may issue a "permit to operate" that shall be posted on the premises by the owner or operator.

Hot Water Heating Boilers (set pressure 0-160 pounds per square inch and maximum 250° F temperature) require an **external inspection every 36 months** similar to the steam heating boilers above.

NOTE 1: Commercial boiler owners and users are required to obtain and maintain a current "permit to operate - PTO in accordance with Wisconsin Boiler Code section Chapter Comm 41.24.

NOTE 2: Single family and duplex boilers are exempt from periodic inspection per Comm 41.18(1)b, owners should reference the equipment owner's manual for operating procedures and maintenance or obtain applicable maintenance and inspection service from a reputable heating contractor or local building inspection official.

### MAINTENANCE TIPS – GENERAL INFORMATION

#### Responsibility

Owners are responsible to obtain/maintain documentation on equipment, assure code compliance and safe operation.

#### New installations

- Boilers must be ASME constructed and identified with proper stamping on the nameplate.
- Contractors must submit Installation Registration form, SBD-6314 to the Department.
- An inspection, registration B# on the boiler and an inspection report submittal by certified inspector are required.
- A valid PTO is needed and must be posted during operation.

Existing installations (See Commercial Boiler Inspections above for periodic inspection required)

- Keep boiler room clean. Good housekeeping rules are a great start to safety.
- Assure adequate/sound boiler piping supports, foundations and settings for all equipment.
- Maintain clearances for operation, repair and maintenance as recommended by manufacturer.
- Make provisions for easy access to ladders/runways/controls, safe exiting and egress in the boiler room.
- Protect the water supply to the boiler by an approved back-flo preventer and keep floor drains free and clear.
- Repair leaking steam, water, fuel and other boiler connections, and minimize pump leakage.
- Maintain valves, fittings, assure allowances for thermal expansion and properly insulate applicable piping.
- Identify or mark piping systems including flow direction or post a current piping diagram.
- Check fuel system and test boiler safety devices per manufacturer's recommendations.
- Provide ventilation and adequate "combustion air " for all fired appliances in the boiler room.
- Clean, inspect exhaust venting, breeching and chimney to assure proper draft to remove combustion gases.
- Provide boiler water analysis and chemical treatment to prevent corrosion, pitting and scale.
- Test safety or relief valves by lifting test lever at least once a year.
- Obtain the services of a trained, knowledgeable boiler operator or provide training for the operator.
- Keep a boiler operation log.

Important boiler appurtenances, valves and fittings that owners and operators should know and recognize:

Steam Boilers:

- A **stop valve** in both the steam supply and return line for repairs or isolation.
- A **pressure gauge** for steam boilers (connected with a siphon and graduated 1 ½ -2 times the safety set pressure)
- At least one **safety valve** on steam boilers to prevent excessive pressure.
- **Two pressure controls** on steam boilers (one high limit and one operating control)
- At least **one low water cut-off** on all steam boilers
- A **water column/site glass** on all steam boilers with properly sized blow down valves to flush and clean.
- At least **one bottom blow-down valve** to remove mud and scale.(two valves when over 100 PSI)

Note: Items listed above are only a guide.

Hot Water boilers

- A **stop valve** in both the boiler supply and return line for repairs or isolation.
- A **pressure/temperature gauge** for hot water boilers (graduated 1 1/2 –3 1/2 times relief valve set pressure)
- At least one **relief valve** on hot water boilers to prevent excessive pressure.
- **Two temperature controls** on hot water boilers (one high limit set at max 250 ° F and one operating control)
- At least **one low water cut-off** on hot water boilers over 400,000 BTU heat input.
- An **expansion tank** on hot water heating boilers to allow for expansion contraction of water in the system.
- At least **one bottom blow-down valve** to remove sediment from the boiler bottom.

Note: Items listed above are only a guide.

## QUICK INTERNET REFERENCE SOURCES

Wisconsin, Department of Commerce:

<http://www.commerce.state.wi.us/>

Safety & Buildings Division website:

<http://www.commerce.state.wi.us/SB/SB-HomePage.html>

Get Wisconsin Safety and Buildings codes: (Boilers, Refrigeration Buildings, plumbing, credentials etc.)

<http://www.commerce.state.wi.us/SB/SB-DivCodesListing.html>

Wisconsin Boiler and Pressure Vessel code, Comm 41 copy:

<http://www.legis.state.wi.us/rsb/code/comm/comm041.html>

Boiler registration form SBD-6314 copy:

<http://www.commerce.state.wi.us/SB/SB-DivForms.html#Boilers>

City of Milwaukee Boiler Mechanical Safety website: (Licensing & American Society of Power Engineers)

<http://www.ci.mil.wi.us/citygov/dns/main/sections/construction/boil/BOILERP1.html>

National Board of Boiler and Pressure Vessel Inspectors website: (Click “Publications” for additional info)

<http://www.nationalboard.org/>